

BMP-26

BMP: DEWATERING STRUCTURE

Definition

A temporary settling and filtering device for water which is discharged from dewatering activities.

Purpose

To filter sediment-laden water prior to the water being discharged off-site.

Conditions Where Practice Applies

Wherever sediment-laden water must be removed from a construction site by means of pumping.

Planning Considerations

Water which is pumped from a construction site usually contains a large amount of sediment. A dewatering structure is designed to remove the sediment before water is released off-site.

This practice includes several types of dewatering structures which have different applications dependent upon site conditions and types of operation. Other innovative techniques for accomplishing the same purpose are encouraged, but only after specific plans and details are submitted to and approved by the Plan-Approving Authority.

A dewatering structure may not be needed if there is a well-stabilized, vegetated area onsite to which water may be discharged. The area must be stabilized so that it can filter sediment and at the same time withstand the velocity of the discharged water without eroding. A minimum filtering length of 23 meters (75 feet) must be available in order for such a method to be feasible.

Design Criteria

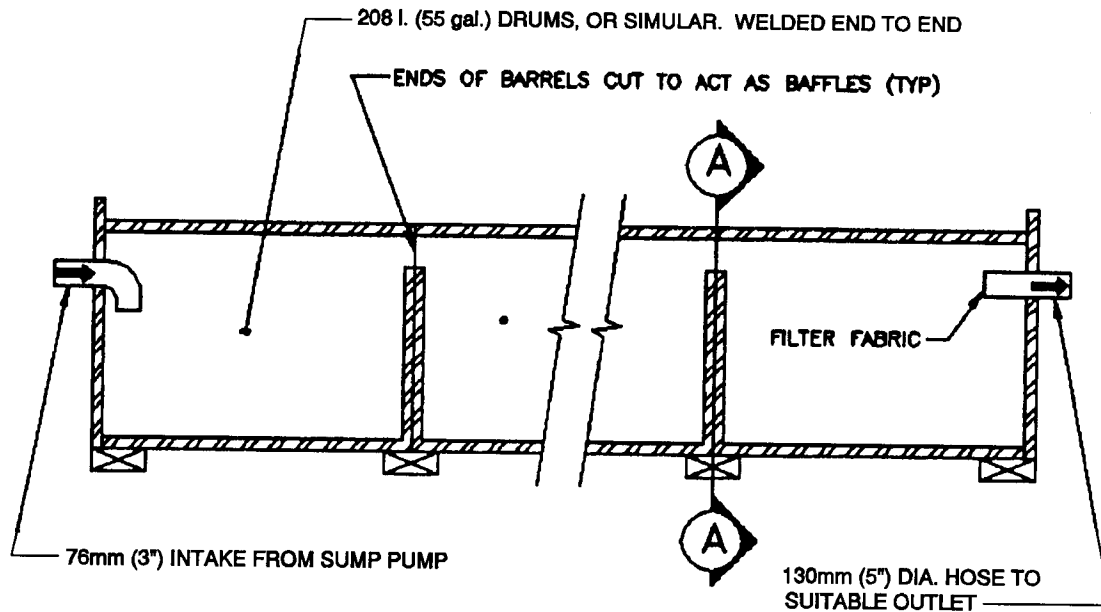
1. A dewatering structure must be sized (and operated) to allow pumped water to flow through the filtering device without overtopping the structure.
2. Material from any required excavation shall be stored in an area and protected in a manner that will prevent sediments from eroding and moving off-site.
3. An excavated basin (applicable to "Straw Bale/Silt Fence Pit") may be lined with filter fabric to help reduce scour and to prevent the inclusion of soil from within the structure.
4. Design criteria more specific to each particular dewatering device can be found in Figures 26-1 through 26-3.

Construction Specifications

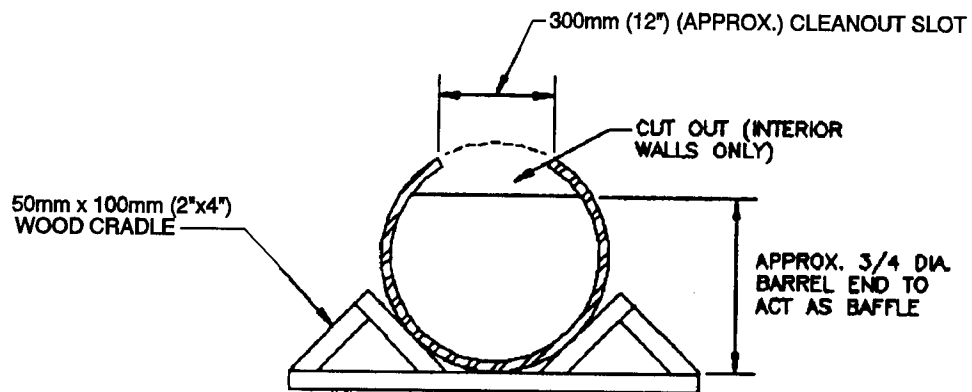
1. Portable Sediment Tank (see Figure 26-1)
 - a. The structure may be constructed with steel drums, sturdy wood or other material suitable for handling the pressure exerted by the volume of water.
 - b. Sediment tanks will have a minimum depth of 600 mm (2 ft.).
 - c. The sediment tank shall be located for easy clean-out and disposal of the trapped sediment and to minimize the interference with construction activities.
 - d. The following formula shall be used to determine the storage volume of the sediment tank:

Pump discharge (liter/min.) x 0.12 = cubic meters of storage required
(Pump discharge (gallons/min.) x 16 = cubic feet of storage required)
 - e. Once the water level nears the top of the tank, the pump must be shut off while the tank drains and additional capacity is made available.
 - f. The tank shall be designed to allow for emergency flow over top of the tank.

FIGURE 26-1: PORTABLE SEDIMENT TANK



ELEVATION



CROSS-SECTION A-A

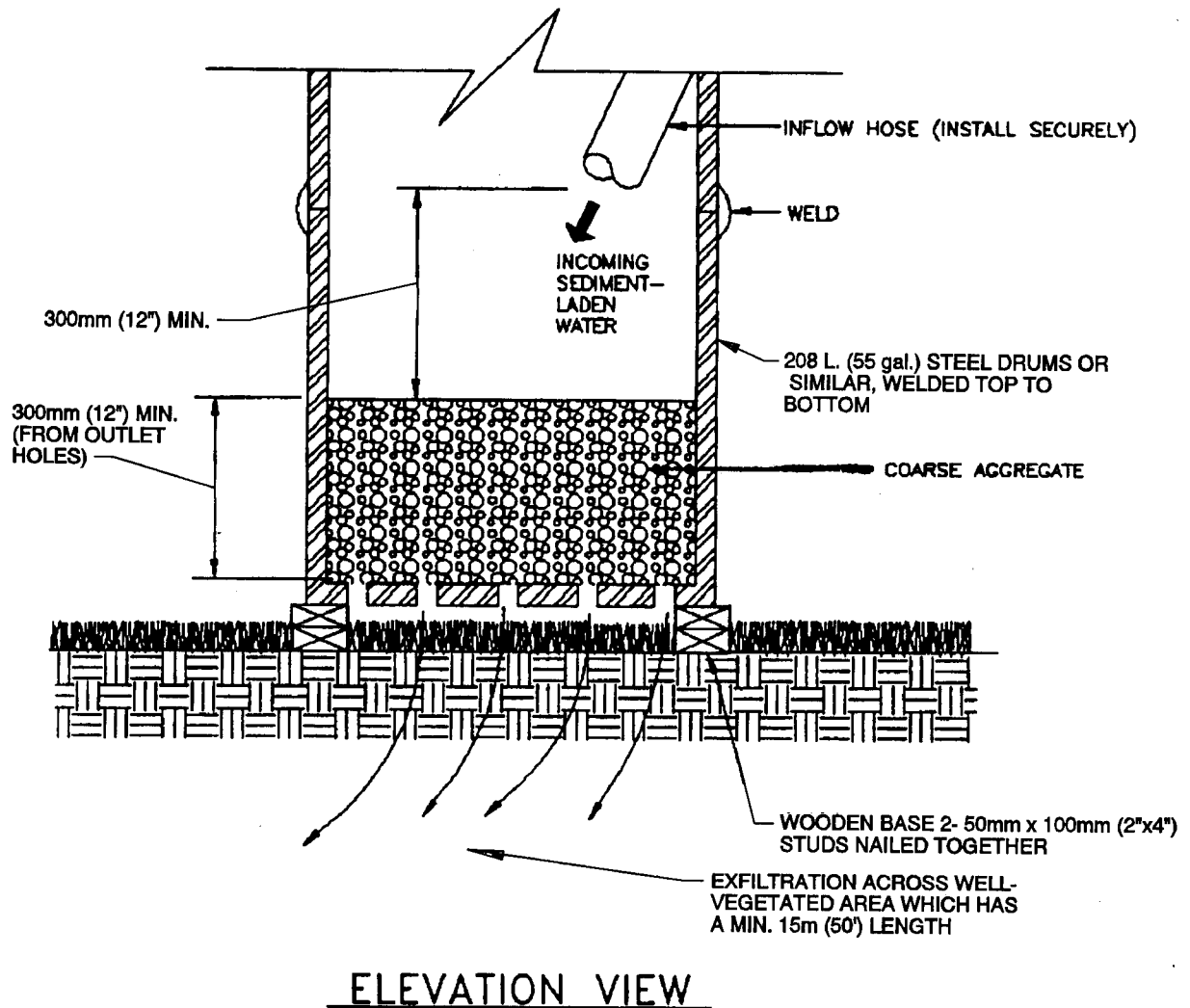
- g. Clean-out of the tank is required once one-third of the original capacity is depleted due to sediment accumulation. The tank shall be clearly marked showing the clean-out point.

2. Filter Box (see Figure 26-2)

- a. The box selected should be made of steel, sturdy wood or other materials suitable to handle the pressure requirements imposed by the volume of water. Normally readily available 208 liter (55 gallon) drums welded top to bottom will suffice in most cases.
- b. Bottom of the box shall be made porous by drilling holes (or some other method).
- c. Coarse aggregate shall be placed over the holes at a minimum depth of 300 millimeters (12 inches), metal "hardware" cloth may need to be placed between the aggregate and the holes if holes are drilled larger than the majority of the stone.
- d. As a result of the fast rate of flow of sediment-laden water through the aggregate, the effluent must be directed over a well-vegetated strip of at least 15 meters (50 feet) after leaving the base of the filter box.
- e. The box shall be sized as follows:
Pump discharge (liter/min.) x 0.12 = cubic meters of storage required
(Pump discharge (gallons/min.) x 16 = cubic feet of storage required)
- f. Once the water level nears the top of the box, the pump must be shut off while the box drains and additional capacity is made available.
- g. The box shall be designed/constructed to allow for emergency flow over the top of this box.
- h. Clean-out of the box is required once one-third of the original capacity is depleted due to sediment accumulation. The tank shall be clearly marked showing the clean-out point.
- i. If the stone filter does become clogged with sediment so that it no longer adequately performs its function, the stones must be pulled away from the inlet, cleaned and replaced.

NOTE: Using a filter box only allows for minimal settling time for sediment particles; therefore, it should only be used when site conditions restrict the use of the other methods.

FIGURE 26-2: FILTER BOX



3. Straw Bale./Silt Fence Pit (see Figure 26-3)

- a. Measure shall consist of straw bales, silt fence, a stone outlet (a combination of riprap and aggregate) and a wet storage pit oriented as shown in Figure 26-3.

- b. The structure must have a capacity which is dictated by the following formula:

Pump discharge (liter/min.) x 0.12 = cubic meters of storage required

(Pump discharge (gallons/min.) x 16 = cubic feet of storage required)

In calculating the capacity, one should include the volume available from the floor of the excavation to the crest of the stone weir.

- c. In any case, the excavated area should be a minimum of 1 meter (3 feet) below the base of the perimeter measures (straw bales or silt fence).
- d. The perimeter measures must be installed as per the guidelines found in BMP-4, STRAW BALE BARRIER and BMP-5, SILT FENCE.
- e. Once the water level nears the crest of the stone weir (emergency overflow), the pump must be shut off while the structure drains down to the elevation of the wet storage.
- f. The wet storage pit may be dewatered only after a minimum of 6 hours of sediment settling time. This effluent should be pumped across a well vegetated area or through a silt fence prior to entering a watercourse.
- g. Once the wet storage area becomes filled to one-half of the, excavated depth, accumulated sediment shall be removed and properly disposed of.
- h. Once the device has been removed, ground contours will be returned to original condition.

Maintenance (All dewatering structures)

- 1. The filtering devices must be inspected frequently and repaired or replaced once the sediment build-up prevents the structure from functioning as designed.
- 2. The accumulated sediment which is removed from a dewatering device must be spread on-site and stabilized or disposed of at an approved disposal site as per approved plan.

[illegible]

Diagram illustrating a trench cross-section. The trench has a flat bottom and a minimum width of 1m (3'-0"). The existing ground level is shown above the trench. The trench depth is indicated as 100mm (4"). The trench walls are shown with a 150mm (6") thickness. The excavated area is labeled "EXCAVATED AREA".

Diagram illustrating a riprap structure. The structure consists of a base layer of **DRY RIPRAP CLASS A1** and a top layer of **AGGREGATE DEPTH 100mm (4")**. The top layer has a slope of **2:1**. The width of the top layer is **460mm (1'-6")**. The flow direction is indicated by an arrow labeled **FLOW**. The structure is shown on a sloped embankment, with an **EXCAVATED AREA** indicated below the structure.

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